IN THE UNITED STATES DISTRICT COURT FOR THE
NORTHERN DISTRICT OF OKLAHOMA

W. A. DREW EDMONDSON, in his capacity as ATTORNEY GENERAL OF THE STATE OF OKLAHOMA and OKLAHOMA SECRETARY OF THE ENVIRONMENT C. MILES TOLBERT, in his capacity as the TRUSTEE FOR NATURAL RESOURCES FOR THE STATE OF OKLAHOMA, Plaintiff,	
vs.	4:05-CV-00329-TCK-SAJ
TYSON FOODS, INC., et al, Defendants.	

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VOLUME I OF THE VIDEOTAPED

DEPOSITION OF VICTOR BIERMAN, PhD, produced as a witness on behalf of the Plaintiff in the above styled and numbered cause, taken on the 14th day of April, 2009, in the City of Tulsa, County of Tulsa, State of Oklahoma, before me, Lisa A. Steinmeyer, a Certified Shorthand Reporter, duly certified under and by virtue of the laws of the State of Oklahoma.

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identify that document for the Record?
A Paper published in transactions of the ASAE, which is the American Society of Agricultural Engineers. Title is Modeling -- it was 2005. Title is Modeling the Average Annual Nutrient Losses of Two Watersheds in Indiana Using GLEAMS-NAPRA, and that is N-A-P-R-A. 03:36PM
Q Are you familiar with this paper, sir?
A I've read this paper. The senior author is a Adeuya, if I'm pronouncing that correctly, and Dr. Engel was the third author. 03:36PM
Q All right, sir. Are you familiar with the American Society of Agricultural Engineers?
A I know what it is. I'm not intimately familiar with it. I'm not a member. 03:36PM
Q Are you familiar with the publications of that organization?
A I've read some of them, yes.
Q Do you know whether or not they're peer reviewed? 03:36PM
A I don't know if all of them are peer reviewed, but I believe this one here is peer reviewed.
Q Okay. In this particular paper, did the authors and investigators use GLEAMS on a watershed scale basis? 03:37PM

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A I can't recall. This is one of many papers that I've read. I would have to read it again in order to answer that question. The authors, of course, use GLEAMS. I can't recall the details sitting here, sir. 03:37PM
Q Okay, and it was for a watershed; correct, the title would indicate that?
A Well, the title indicates that. That doesn't tell me what's inside of it --
Q Okay. 03:37PM
A -- in detail.
Q I appreciate that, sir. If you would, turn to Page 1741.
A Yes.
Q Table 2 at the bottom right-hand, what land uses were evaluated using the GLEAMS model in this investigation? 03:38PM
A In Table 2 it indicates the following land uses: Corn, farmstead, pastures/grass, small grains, soybean, urban/residential, woodland. 03:38PM
Q Okay. So this particular GLEAMS analysis included both urban runoff and forest or woodland runoff; is that correct?
A Well, I don't know that. I just know what I read in Table 2. 03:38PM

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Q Would you turn to Page 1742, sir?
A Yes.
Q Under model calibration -- do you see that on the left-hand column?
A Yes. 03:38PM
Q Under hydrology, would you read the first statement there, sir?
A The historical flow data were divided in two parts. The first half of the data, 1975 through 1976, was used for calibration of hydrology, and the second half, in paren, 1977 through 1978, was used for validation. 03:39PM
Q So in this particular situation the investigators performed both a calibration and a validation step? 03:39PM
A They described what they did as calibration and validation.
Q And they divided the data in half in order to do that?
A They divided -- they say they divided the data into half in order to do what they said they did. 03:39PM
Q Is that the same approach employed by Dr. Engel in the IRW analysis?
A I don't know if he divided the data in half, but my recollection from his expert report is that 03:39PM

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he split the data for the time period 1998 through 2006 into a time period -- into two time periods, and he calibrated -- used one for calibration and used the other for his purported validation.
Q Below that statement, sir, it talks about how GLEAMS was calibrated. Do you see where it says that in the middle of that paragraph, GLEAMS is calibrated? 03:40PM
A Yes.
Q Would you read that, sir? 03:40PM
A GLEAMS was calibrated using observed data from the automatic water quality samplers at the outlet of Smith-Fry and Driesbach.
Q Okay. Did Dr. Engel employ a similar process in the Illinois River by using -- calibrating a GLEAMS at the outlet from the water streams where the runoff was collected? 03:40PM
A We need to be more specific here. Dr. Engel's GLEAMS model for the Illinois River watershed computed phosphorus -- excuse me. It computed flow and phosphorus at edge of field. He did not compare the computations for hydrology or edge of field phosphorus loads to data at edge of field. 03:41PM
Q Okay, but in this particular paper, the calibration was done at the outlet for the GLEAMS 03:41PM

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runoff, correct, in this paper?
A Well, that's what it says, but I don't know where that outlet was in relationship to the field or the HRU or the HRUs being modeled without reading the rest of the paper. 03:41PM
Q Okay. Dr. Engel in his approach in the IRW calibrated the runoff on GLEAMS, the GLEAMS portion, looking at the outlet of phosphorus contributions at the end of Illinois River, Baron Fork and Caney Fork; correct? 03:42PM
A He did compare the output of his GLEAMS model, plus the wastewater treatment plant loads, to his observed computed total phosphorus loads at the three outlet stations.
Q And that's how he performed his calibration on the GLEAMS? 03:42PM
A He stated that that is how he performed his calibration and purported validation for GLEAMS, yes.
Q Let me hand you what's marked as Exhibit No. 9, sir, and if you can identify that for the Record. 03:42PM
A Paper published in the same journal in 2007, transactions of the AS -- no. Made a mistake. Transactions of the ASABE, and that is American Society of Agricultural & Biological Engineers in 03:43PM

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2007. The title is Effect of El Ni±o/Southern Oscillation on Simulated Phosphorus Loading in South Florida. Senior author is V. W. Keener, K-E-E-N-E-R.
Q Again, I think that's the same society that published the paper in Exhibit 8; correct? 03:44PM
A No. I thought it was, but I was mistaken. Exhibit 8 was American Society of Agricultural Engineers. This is American Society of Agricultural & Biological Engineers. 03:44PM
Q Do you know whether or not the American Society of Agricultural & Biological Engineers simply represents a name change in the previous name of American Society of Agricultural Engineers?
A No, I don't know that. 03:44PM
Q Do you know whether or not many of the members of the American Society of Agricultural & Biological Engineers focused their research and scientific activities on upland watershed modeling?
A I don't know the answer to the question because I'm not familiar with members of that organization. 03:44PM
Q Have you ever reviewed this paper by Keener which is Exhibit No. 9?
A No, I've never seen this paper. 03:45PM

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Q Okay. Would you turn to the third page over on Page 2083, sir? Under the first column there is a title that says Watershed Assessment Model; do you see that, sir?
A Yes. 03:45PM
Q Okay. Would you read that paragraph? Take a moment to read that and I'll ask you a few questions.
A Should I read it out loud?
Q It's up to you. 03:45PM
A I'll read it out loud consistent with the others.
Q Thank you.
A Watershed Assessment Model, in paren, WAM, W-A-M. WAM's function is to serve as a tool for watershed assessment, using the appropriate model components and available data sources, in parens, SWET, comma, 2004. SWET is S-W-E-T. Next sentence, WAM includes four nutrients submodels for different land uses. The groundwater loading effects of 03:46PM **agricultural management systems, in paren, GLEAMS model, in paren, Leonard, et al, 1987, comma, the Everglades agricultural area model, in paren, E-A-A-M-O-D, all caps, again open paren, SWET, 1996, Bottcher, et al, 1998, and Bottcher is spelled** 03:46PM

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B-O-T-T-C-H-E-R, and two submodels developed by SWET specifically for wetland and urban landscapes, in paren, SWET 2004. For basin S-191, both GLEAMS and EAAMOD were used to simulate daily nutrient loads based on recorded land use, precipitation and 03:46PM **simulated stream flow time series. Stream reaches in the model are routed to the outlet by solving the continuity equation and Manning's equation for uniform channel flow with a variable timestamp of approximately 15 minutes based on the simulated** 03:47PM **stream velocity, open paren, see Jacobson and Bottcher, 1998, for details, closed paren. WAM simulated nutrient loads in 85 defined stream reaches in basin S-191, which ultimately merge at a single reach, reach 2, which enters Lake Okeechobee,** 03:47PM **references to Figure 1B.**
Q Based on this description, sir, does it appear take the WAM model incorporates GLEAMS and some other runoff components with a routing equation in order to determine phosphorus loading to the water body? 03:47PM
MR. BOND: Object to the form.
A What I get from reading this paragraph is that the modeling system uses GLEAMS in conjunction with EAAMOD, but I can't determine in any detail exactly 03:48PM

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Plaintiff,	)	
vs.	)	4:05-CV-00329-TCK-SAJ
TYSON FOODS, INC., et al,	)	
Defendants.	)	

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VOLUME II OF THE VIDEOTAPED DEPOSITION OF VICTOR BIERMAN, PhD, produced as a witness on behalf of the Plaintiff in the above styled and numbered cause, taken on the 15th day of April, 2009, in the City of Tulsa, County of Tulsa, State of Oklahoma, before me, Lisa A. Steinmeyer, a Certified Shorthand Reporter, duly certified under and by virtue of the laws of the State of Oklahoma.

source? I still don't think you've answered my question.
A The South Florida Water Management model represents the -- both overland flow entering the Everglades, as well as flow entering the canals. It also represents groundwater. Those are three -- there are four sources by which water can enter the Everglades. I just listed three. The fourth is -- 09:17AM
Q But I'm asking you about overland flow.
A And I told you -- my answer is that we used the surface flows computed by the South Florida Water Management model and data, phosphorus data for boundary concentrations, multiplied the two together, and that's how we determined the phosphorus inputs due to overland flow and we did the same thing for the canals and the same thing for the groundwaters. 09:17AM 09:18AM
Q Are the processes that talk about overland flow in the South Florida Water Management model described in this paper? 09:18AM
A They're not described in this paper. That paper -- that work is included by reference in several locations because we relied upon that model and its outputs.
Q Did you develop that model, the South Florida 09:18AM

Water Management model?
A No, I did not develop that model.
Q Who did?
A The South Florida Water Management District staff developed it. It's a very sophisticated tool. It's very data rich. 09:18AM
Q You've answered my --
A Many staff and many years have been spent developing and calibrating that model to south Florida. 09:18AM
Q But the overland portion of this work in this paper was performed by someone else, not you or your office; is that correct?
MR. BOND: Object to the form.
A The overland hydraulics at the boundaries to specify loads were developed by others. The phosphorus mass balance model that we developed here represents phosphorus movement in the three-by-three cells, the overland areas and the canals within the Everglades. That work was done by my office, and that's what this model represents. We need -- I think we're stuck here on is the difference between how did we put data into this model and what the model itself actually represents inside the Everglades. This model is of the Everglades. 09:19AM 09:19AM

Q Let me tell you what I'm struck on and maybe you can help me clear it up. Yesterday I asked you what experience you had, in particular any peer-reviewed publications where you actually did work on overland field type runoff contributions of phosphorus, and I believe you referenced this paper as a publication. 09:20AM
A That's correct.
Q And what I discovered, I believe through this examination this morning, is that the work on the runoff itself was not done by you or your office; it was done by someone else; is that not correct? 09:20AM
A Not completely. The work -- the hydrologic model was done by South Florida Water Management District. We used results from that model. We then inside our model spatial domain routed water and routed phosphorus inside these spatial cells across overland areas and through canals. 09:20AM
Q Okay, and so the folks that actually determined the quantity of field runoff was the South Florida Water Management folks; is that correct? 09:20AM
A Yes, that's correct.
Q And they were the ones that also identified the particular sources of field runoff for 09:21AM

phosphorus also; correct?
A Into this model domain, that's correct.
Q Okay, and they also -- well, I think that answers my question. And do you know, sir, from your work on this project what the urban contribution was, that is, the percentage? 09:21AM
A No, I don't.
Q The agricultural percentage?
A No. Those weren't objectives of our work, and I don't know the answers. 09:21AM
Q Okay. Was there a septic tank contribution considered as part of the contribution?
A We didn't consider it explicitly. It may have been included implicitly in the boundary conditions, but I don't know that for sure. 09:21AM
Q What about wildlife?
A Again, that may have been considered implicitly in the boundary conditions. We did not consider it explicitly in the study.
Q Illegal dumping? 09:22AM
A I didn't consider illegal dumping.
Q Recreational use, contributions of phosphorus from recreational use?
A Included implicitly in the model inputs, as would illegal dumping actually. 09:22AM